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Community Involvement and Perceptions on Land Use and Utilization Practices for Sustainable Forest Management in the Nandi Hills Forests Kenya

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Abstract

To ensure the existence of humankind and the sustainable utilization of the earth's resources, deliberate action needs to be channelled towards the conservation of the vital support systems of the entire Earth ecosystems. Forests in this case form quite a crucial part of this wider arrangement that if man does not deliberately conserve and sustainably manage them, they risk being plunged into an irreversible predicament. This study aims at identifying the perception and understanding of the local community on land use and utilization of the Nandi Hills Forests. A mixed methodological design which incorporated both qualitative and quantitative methodologies was embraced. The mixed methodological approaches used in this study were the concurrent triangulation and nested/embedded designs. A four-tier analysis was carried out once all the data had been coded and grouped. The state of the Nandi Hills Forests has been notably influenced by the level of awareness of the local community on the significance of sustainable forest management and what their actions and/or inactions mean to the forests.
Keywords: Community, Involvement, Perceptions, Land use, Utilization, Nandi Hills Forests.

1. Introduction

Since the early 1970s, when a fairly narrowly circumscribed set of activities consisting of woodlots for fuel and 'social forestry' in India (Overseas Development Institute, 2005), there have come a wide range of activities variously called Community Forestry (CF), Adaptive Co-Management (ACM), Community-Based Natural Resource Management (CBNRM), Community Involvement in Forest Management (CIFM) and Participatory Forest Management (PFM). Community resources usually vary in type and or size depending on the laws and policies of different countries. However, the concept of community participation in resource management and conservation has been identified as a key pillar in the sustainability of the world's natural resources. For many, community management mitigates the 'tragedy' of free-for-all exploitation and inefficiencies or injustices of top-down conservation. Expected conservation and social benefits include sustainable supply of ecosystem goods and services; community empowerment; poverty reduction; and more penetrating, relevant, efficient, and just forms of resource governance than top-down, centralized governance (Agrawal 2005; Ribot 1999).

According to Richard Gauld (2000, p.224), introduction of community forest management in the developing world might be the greatest revolution since the start of scientific forestry, at least relative to centralized state control. Moss *et al.* (2005), further asserts that the inclusion of communities in the management of state owned or formerly state owned forest resources has become increasingly common in the last 25 years. Many countries have now developed, or are in the process of developing changes to national policies and legislation that institutionalize Participatory Forest Management (PFM). According to Andy *et al.* (2002), indigenous and other communities are increasingly acknowledged for being important stewards of the global forest estates. This relatively new development provides a historic opportunity for sustainable forest conservation and economic development of some of the world's poorest regions.

Since the late 1980s, some governments of major forested countries have begun to reconsider and reform forest ownership policies. These transitions are driven by three primary considerations. First, governments are increasingly aware that official forest tenure systems in many countries discriminate against the rights and claims of indigenous people and other local communities. Although the data are incomplete, it is estimated that some 60 million highly forest-dependent indigenous forest people live in the rain forests of Latin America, West Africa and South East Asia (World Bank, 2001). An additional 400 million to 500 million people are estimated to be directly dependent on forest resources for their livelihoods. Around the world, indigenous people have legitimate

claims to more forest areas than governments currently acknowledge. In South and Southeast Asia alone, several hundred million people live on land classified as public forest.

International conventions and national political movements are driving governments to recognize the traditional ownership claims of indigenous peoples and recognize legal ownership and land use rights held by them and other local communities (Colchester, 2001). This growing recognition of rights for indigenous and other local communities is not simply an issue of justice. There is also an increasing convergence of economic development and environmental protection agendas. Without secure rights, indigenous and other local community groups lack long-term financial incentives for converting their forest resources into economically productive assets for their own development (Worah, 2002). There is growing evidence that local community-based entities are as good, and often better, managers of forests than federal, regional and local governments. In addition, biologists and protected area specialists are beginning to change perspectives on human interactions with nature, acknowledging that the traditional management practices of indigenous peoples can be positive for biodiversity conservation and ecosystem maintenance. This positive outcome is best gained by devolving control of forest land to communities (Lori, & Susanna, 1997). A recent review by Wunder, (2001), of property rights and deforestation in Ecuador, for example, found that community ownership often provides a disincentive to forest conversion.

A third reason for this transition, as per White and Martin, (2002), is the growing recognition that governments and public forest management agencies often have not been good stewards of public forests. While many countries have proven that public ownership can be effective in protecting and managing forests, others have not developed the governance structures and management capacities necessary to ensure effectiveness. While exploitation is a legitimate use of public forests, in many places forests have been abused to finance political elites and curry political favours. The findings from a number of recent studies on illegal logging and corruption are staggering; illegal logging on public forest lands is estimated to cost forest country governments at least $10 billion to $15 billion a year, an amount greater than total World Bank lending to client countries and greater than total annual development assistance in public education and health.

Miller (2001) asserts that about 50–80% of in the moisture and air above tropical forests come from trees via transpiration. If large areas of these forests are cleared, average annual precipitation drops and the region's climate gets hotter and drier. This process can eventually convert a diverse tropical forest into sparse grassland or even a desert.

In his article, Tragedy of the Commons, Hardin (1968), describes the dilemma in which multiple individuals acting independently in their own self-interest can ultimately destroy a shared limited resource even where it is clear that it is not in anyone's long term interest for this to happen. Hardin asks for a strict management of global common goods via increased government involvement and/or international regulation bodies. In direct counter to Hardin's 'Tragedy of the Commons' thesis (Hardin, 1968), which blames common property (systems of communal resources ownership) for the overuse of common-pool resources by rational self-interested individuals at the expense of the common good, common-pool resources scholars blame open access or '*res nullis*' – absence of any property rights defining the users and rules (Feeny *et al.*, 1990). Common-pool resources are ''goods that can be kept from potential users only at great cost or with difficulty, but that are extractable in consumption and can disappear,'' whereas commons are resources that involve some level of joint access or ownership (McKean, 2000, p.28). These scholars often prescribe local institutions to regulate resource use and curb free-riding behaviour under common property regimes – ''property-rights arrangements in which a group of resource users share rights and duties towards a resource'' (McKean, 2000, p.28). These rights arrangements often embrace 'design principles', which are lists of conditions, deemed to improve institutional success (Ostrom, 1990). Following this argument, forests and forest resources should be used at rates below their sustainable yields or overload limits by reducing population, regulating access or both. However it is difficult to determine the sustainable yield of a forest, partly because yields vary with weather, climate and unpredictable biological factors, and because getting such data is expensive (Miller, 2001).

In as much as community natural resources management (CNRM) was introduced and emphasized in Africa by the early 1990s (FAO, 1999a), it has not met its targeted objectives. CNRM follows the compelling theoretical notion that empowering communities to use their knowledge and resources to solve local environmental problems can make resource governance more penetrating, relevant, efficient, equitable, and lasting than at least centralized regimes (Ribot, 1999; Agrawal, 2005). However, disaffection with failures of centralized conservation may have allowed an uncritical embrace of ''participation'' (Cook & Kothari, 2001). For instance, "conservation is often simplistically assumed to always be the shared local goal" (McCay, 2002, p.371), and

local goals are assumed to be consistent with broader goals. Increasingly, studies now indicate that expected conservation and social goals are rarely realized (e.g., Campbell *et al*., 2001; Kellert *et al*., 2000). In fact, growing evidence of failure has sparked a backlash against CNRM in Uganda, Ghana, Indonesia, and Nicaragua (Ribot, 2002).

2. Materials and Methods

The study employed a mixed methodological design which incorporated both qualitative and quantitative methodologies. The mixed methodological approaches used in this study were the concurrent triangulation and nested/embedded designs. A four-tier analysis was carried out once all the data had been coded and grouped. The sample frame of the study is for persons above 18 years in Nandi County and there was heterogeneity in the population in the sample frame due to variety of issues such as: spacio-topographical exposure to the forests, urbanization, intermarriages, migration, education levels and even economic statuses. To alleviate some of these causes of heterogeneity to the closest achievable extent, the sampling units were hence delimitated based on the administrative boundaries (largely per district and finely per division). All the districts (4 districts) in the Nandi County were sampled. Relevant stakeholders (in the management of the Nandi Forests) other than the mainstream local community were also purposively sampled to obtain data. The desired sample size of households for simple random sampling was obtained from a formula as used by Fisher *et al* (1998) which yielded a sample size of 306 respondents. Oral interview schedules, questionnaires, Digital cameras and review of documented literature were used in data collection.

3. Results

3.1 Economic Activities

The major economic activities in the study area are dairy and agriculture. In the Nandi South Forest, agriculture accounts for over 90% of household sustenance system, with 54% of the household income being derived from agriculture (FAO, 2000). The case of Nandi North Forest Catchments agriculture, principally crop and dairy activities drive the economy (Government of Kenya, 2001a). The key food varieties are maize, Irish potatoes, sorghum and millet, while tea, coffee and pyrethrum are the cash earners. Most of these crops are grown under mixed farming conditions. In the Nandi hills, the high altitude influences the rainfall patterns and provides adequate rainfall for farming and agriculture which is the economic base of the people. Besides agriculture, there is horticulture which also brings in the economic empowerment to the people. Cattle-raising is practiced to a large extent here. The economic potential of the area is immense and it has not been fully exploited (Government of Kenya, 2001b).

Poverty in the study area afflicts about 50% of the population; residents in the Nandi Hills and Nandi Forest water catchment areas (Government of Kenya, 2003). Under-utilization and inequitable distribution of resources, high cost of farm inputs, poor and inadequate education and unemployment have been identified as the major causes of poverty in the study area. As a consequence, the poor have been driven to encroaching into the forested areas and even to settle on steep slopes of more than 55^0, a figure that is 10^0 more than what is recommended by the Ministry of Agriculture (Government of Kenya, 2001b). This has detrimentally affected land use especially in relation to cultivation on steep slopes and forest cover depletion through encroachment.

The study area is of great economic importance at the local as well as at the national level especially in agriculture and forestry (Government of Kenya, 2003). Non timber products from the forest such as wild honey, fruits, medicinal plants and edible animals support livelihood systems of the local population. However, with increasing population and increasing human needs, the harvesting of forest resources is now unsustainable (Mathu, 2007). The forest trees are now being cleared to create more land for agriculture, grazing and illegal timber harvesting, especially of the Elgon Teak tree species (Adhola *et al*., 2009).

3.2 Social Aspects

This subsection focuses on the population dynamics of the Nandi Hills and Nandi Forests and attempts to link forest resource utilization with issues of population.

3.2.1 Population density

According to the Central Bureau of Statistics (2003), the projected population density is 285 persons per square kilometre in areas with the greatest potential for agriculture, 276 persons per square kilometre in medium to high potential areas, and lower potential areas have a population density of 162 persons per square kilometre. A dense and rapidly growing human population in the Nandi Hills and the surrounds of the Nandi Forests has

resulted in increased pressure on land (Bennun & Njoroge, 2001). Several large excisions have taken place and human settlement has moved past the pegs marking the forest boundaries (Adhola *et al.,* 2009).

3.2.2 Population composition

The population of Nandi County stands at 752,965 people, the sex ratio is 1:1 with a population growth rate of 2.9% annually and the bulk of the population (68%) is youthful (0-25 years) (Government of Kenya, 2005; KNBS, 2010)

3.3 The Nandi District Community

Issues of land ownership, size of land owned by each household, land use practices, perceptions of forest use, status of the forests and their and potential, and the sources of community knowledge were investigated via the questionnaire administered to the households (n=306) that were sampled in the Nandi district.

3.3.1 Land Ownership

Most of the sample of residents (285) of Nandi County own land (93.1%) and only 21 (6.9%) own no land within the study sites (see Table 1). Further categorization of the size of the land owned by each household (Table 1) reveals that most occupy between one to five acres (46%).

Table 1: Land Ownership by Size

Size of Land	Frequency	Percent
None	21	6.9%
Less than 1 acre	67	21.9%
1 – 5 acres	141	46.1%
6 – 10 acres	68	22.2%
More than 10 acres	9	2.9%
Total	306	100.0%

3.3.2 Land Use Practices

The land use practices, as revealed in the study are outlined in Figure 1 indicate that maize farming is the most common land use practice at 48.4%. Biodiversity loss was one of the most evident impacts of land use change within the Nandi Hills forest ecosystems.

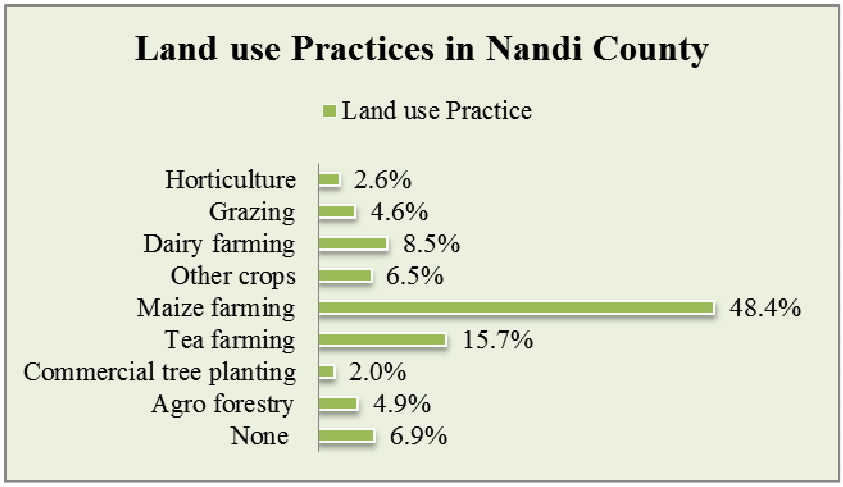

Figure 1: Land use Practices in Nandi County

3.3.4 Perceptions of Forest Use

In part three of the household questionnaires the respondents were asked to indicate if they felt that the forests were useful to them. A total of 271 respondents, representing 89.4% of the valid households (n=306), indicated that forests were indeed useful to them by indicating a 'Yes' response on the questionnaire. Thirty two respondents (approximately 10% of households interviewed) said that forest were not useful.
The following were responses on how forests were useful to the community:

a) Provide dry season pasture for livestock;
b) Increase the aesthetic value of the environment;
c) Are water catchments that attract rainfall and store water for rivers;
d) Are a source of timber and firewood for domestic and industrial uses;
e) Act as purifiers of water and air thus ensuring ecosystems balance;
f) Are habitats for an array of biodiversity including plants, birds, reptiles and other wild animals;
g) Are tourists' attraction sites that benefit the government and the local communities through revenues generation
h) The respondents who indicated forests were not useful to them believed that they are:
i) Hideouts for thieves;
j) Havens for wild and dangerous animals;
k) Only important to the government; and
l) Are barriers to extension of farmlands - if one destroys them then one is arrested by the government

3.3.5 Perceptions of the Current Status of the Nandi Hills Forests and Their Potential

Results of focus group discussions, key informant and household interviews revealed that a significantly large proportion of the respondents perceived the forest cover in these areas as rapidly declining. The primary drivers of this trend were noted as intensification of agriculture and the need of more land for food production to feed the teeming populations. The majority of households sampled indicated that the forest cover of Nandi Hills Forest has suffered severe deforestation and degradation through heavy exploitation resulting from an escalating demand for timber and fuel wood, land for cropping and grazing. They further purported that the depletion and degradation of the Nandi hills forest are a threat to ecosystem diversity and a fundamental influence on the declining standard of living of many households. The decline in forest resources – and a subsequent decline in land productivity and lack of forage and fodder as well as other tree products and services – was perceived by the farming communities in almost all the locations in the study site.

The forest community indicated that, tea farming, maize production, horticulture farming and livestock rearing are the major agricultural activities in these districts. Consequently, more forest land has been cleared or interfered with to support these activities with a serious loss to biodiversity and ecosystem services provisioning. The community reported that planting of trees for water conservation would prevent the drying up of streams that supply domestic water. A tree called *Sesigium* in the local language was perceived specifically to help in water purification. Further it was widely suggested that this tree species be planted along the riparian areas and in wetlands for water conservation.

Culturally forests were perceived to have a religio-cultural significance. Among the *Kalenjin* groups forest trees and products that were used during circumcision and marriage ceremonies. The forest also acted as a home for initiates during the rites of passage of male members of the community up to the time they fully recovered to rejoin the community.
In terms of livelihood support for the households, forests were perceived to provide dry season grazing relief, honey, wild berries and fruits, wild edible roots and undergrowths that supplemented peoples' diets. It was also noted that the local *Kalenjin* Community borrowed a lot of forest conservation practices form the *Ogiek*, the aboriginal community of Nandi Hills area. A section of the households also reported that the forest modified the climate by attracting rain and creating a micro-climate that favoured the production of tea and other agricultural crops. This was very significant in defining household socioeconomic power.

The study also shows that farmers are very interested in tree planting and are in favour of private ownership of trees and forests (farm and/or plantation forestry). Tree planting and forestry at the household level was seen to have the capacity to supplement household incomes. This could be achieved through planting of fruit trees, fodder trees and beekeeping for small scale commercial purposes. Protection of natural regeneration is also recognized as an important complement to tree planting in the rehabilitation of degraded forest landscapes.

4. Discussion

4.1 Community Perceptions on Utilization of Forest Resources

The people's perception that forests are critical to their livelihoods is vital if they are to become involved in fighting for the conservation of their habitat. Many households were able to link forests with values such as water conservation, income generation, flood control, rainfall, food and medicine, grazing lands during the dry season, tourism development and biodiversity conservation. Their awareness on these aspects corroborates the assertions of White and Martin (2002) who have postulated that if indigenous and other local communities have been increasingly acknowledged for being important stewards of forest estates, they would ensure that forest utilities and environmentally crucial resources are exploited sustainably.

4.1.1 Perceptions on Forests' Significance

The study indicate that a significant portion of the local community (89.4%) believe that forests and forest resources are useful to them. These data, and the fact that the Kenya Forest Act of 2005 (Government of Kenya, 2005) empowers local communities in forest management through the Community Forest Management mechanism; suggest that there is hope for the sustainable management of the Nandi Forests.

As pointed out by the respondents, the forests are crucial since they act as water catchments, are a source of timber and firewood, are habitats for an array of floral and faunal biodiversity and are major tourist attraction sites that benefit the government and the local communities through revenues generation. The few (10.6%) who did not see the significance of these forests were not able to build a strong case. Their reservations were informed by issues such as: the forests being hideouts for thieves, havens for wild and dangerous animals and barriers to extension of farmlands.

4.1.2 Perception of the Forest Status

The submission by Enger, *et al.* (1992) that whenever a resource is exploited, the two major interests that are always in conflict are environmental and economic has been buttressed by the strong perception by the locals that the forest cover in the area had rapidly declined and suffered severe deforestation and degradation due to human exploitation. Farmers' responses suggested that the forest and wetlands under the jurisdiction of the government had been more severely deforested and degraded compared to community and private owned ones. This is because the forests and wetlands were perceived as government property of some sort. The perception was evidenced with great extremity during the post election violence in Kenya after the 2007 general elections, when the locals torched sections of forests to express their displeasure with the government. They also used some wetlands as burying sites for victims of the violence. The most affected areas were found around Koyo wetland and Kimondi forest in Nandi South District.

However, the keen interest and involvement of farmers in tree planting and particularly agro-forestry and plantation forestry is a sign of hope in boosting the general forest cover of the area. The willingness by the local community to play a part in enhancing the natural regeneration of the indigenous forests is based on the perception, amongst others, that further irresponsible forest exploitation would result in little or no rainfall in the area. Albeit most of them not understanding the push and pull factors of that determine precipitation in the Nandi County, their appreciation of the forests' role in the hydrological cycle is valuable.

Data generated from the local community indicated that, tea farming, maize production, horticulture farming and livestock rearing are the major agricultural activities in these districts. Consequently, more forest land has been cleared or interfered with to support these activities, with a serious loss of biodiversity and ecosystem services provisioning. Community members stated that planting of trees for water conservation would prevent the drying up of streams that supply domestic water. A tree called *Sesigium* in the local language was perceived specifically to help in water purification. Further it was widely suggested that this tree species be planted along the riparian areas and in wetlands for water conservation. Tree planting and forestry at the household level was seen to have the capacity to supplement household incomes. This could be achieved through planting of fruit trees, fodder trees and beekeeping for small scale commercial purposes.

The data reveals that there is also strong religious and cultural significance of forests. This is pegged on the perception that the forest is more of a sacred place compared to other areas that are dominated by other land uses. For instance, the use of *'Sinendet'* (*Periploca linearifolia), a creeper,* as a symbolic plant during *'Tuluap Ng'etk'* (a place for circumcision ceremony) to signify successful completion of the circumcision process is an important ritual. The choice of the *'Sinendet'* by the community at the plant for this purpose is based on its fast regeneration. Albeit being able to regenerate fast, *'Sinendet'* is a forest interior specie that has been conserved as it is only harvested once a year during circumcision ceremonies.

As noted earlier, if indigenous and other local communities are acknowledged for being important stewards of forest estates, they would better ensure that forest utilities and environmentally crucial resources are exploited sustainably (White & Martin, 2002). Part of the acknowledgement process is acknowledgement of their knowledge, perceptions and beliefs and, as such, any community environmental education intervention would probably be enhanced by making explicit and bringing into focus via discussion the issues that have been noted above.

5. Conclusion

The passage of the Kenya Forest Act, 2005, was a major milestone in enhancing the involvement of the Nandi Forests adjacent communities in the management of the forest. The anchoring of community forestry principles in law that gave way to the formation of Community Forest Associations (CFAs) has seen the progressive increment of participation of the local community in the management of the Nandi Forests, exemplified by the already several existing CBOs in the area. This in return has contributed to the increased awareness and consciousness of the local community on the need and importance of conserving the forests not just to them but for the future generations. The majority of households sampled indicated that the forest cover of Nandi Forest has suffered severe deforestation and degradation through heavy exploitation resulting from an escalating demand for timber and fuel wood, land for cropping and grazing. They further noted that the depletion and degradation of the Nandi Forest are a threat to ecosystem diversity and a fundamental influence on the declining standard of living of many households.

6. Recommendation

The paper recommends the importance to explore both the observable and perceived impacts of land use change; how both perceived and observable impacts differ across different types of socio economic classes and proximity to forest ecosystems and the reasons views may differ across groups on the utilization practices of forest resources. This will help in further disaggregating the awareness creation mechanisms relevant to the various cohorts or socioeconomic classes of the community.

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